4.0 CHEMICAL BURIAL SITE

4.1 Declaration

This section provides the declaration portion of the ROD/RAP for the Chemical Burial Site.

4.1.1 Location

The Chemical Burial Site is located west of Main Magazine Road, within the southern portion of SIAD (Figure 1.1).

4.1.2 Assessment of the Site

The distribution and extent of contamination at the Chemical Burial Site was assessed based primarily on activities conducted and data obtained during the 1990 Phase I RI (JMM and E.C. Jordan, 1991). Groundwater sampling was conducted at the site during the 1991 Group II RI (JMM, 1992), 1992 Group I Follow-Up RI (Montgomery Watson, 1993), and 1993 Group I and II Follow-Up RI (Montgomery Watson, 1994). The results are summarized as follows:

- The potential source of contamination at the Chemical Burial Site was the previous burial of drums containing retrograde chemicals in a large trench at the site. In 1974, the drums were excavated and removed and the trench was backfilled. During excavation, all drums were observed to be intact.
- During geophysical investigations and test pit excavations conducted in 1990, no remaining buried drums or other containers were detected at the site.
- Very low levels of TCE were detected in soil gas in the southwestern and northeastern portions of the site. The low levels of TCE in soil gas in the southwest portion of the site may be related to sources in the northwest portion of the Abandoned Landfill.
- Low levels of pesticides and VOCs were detected in subsurface-soil samples. All inorganics detected in soil are interpreted to be naturally occurring.
- TCE was detected in the upgradient monitoring well at the site. No VOCs were detected downgradient of the Chemical Burial Site. The TCE in the upgradient well is interpreted to be part of a TCE plume originating to the south in the northwestern portion of the Abandoned Landfill. All inorganics detected in groundwater are interpreted to be naturally occurring. Based on the available soil and groundwater data, the Chemical Burial Site does not appear to be a source of groundwater contamination.

No human health or ecological risks associated with soil and groundwater exposure were identified at the Chemical Burial Site.

4.1.3 Description of the Selected Remedy

No further action is recommended for the Chemical Burial Site.

4.1.4 Statutory Determinations

Because no remedial actions are required at this site, no statutory determinations of remedial actions are necessary.

4.2 Decision Summary

This section provides the site-specific factors and analysis that were considered in the selection of the response action for the Chemical Burial Site.

4.2.1 Site Description

The Chemical Burial Site is a 100- by 600-foot area completely enclosed by the Construction Debris Landfill (Figure 4.1).

4.2.2 Site History and Enforcement Activities

The Chemical Burial Site was used from January 1971 to October 1972 for trench burial of retrograde drummed chemicals (Benioff, et al., 1988). In 1974, the drums were excavated and removed and the trench was backfilled (USATHAMA, 1979). Removal operations, conducted between March 4, 1974, and May 15, 1974, consisted of removing overburden using a dozer and scraper, excavating a trench to a depth of 12 feet, and removing the chemicals by hand (USAEHA, 1988). The chemicals were repackaged, overpacked into steel drums or containers, and transferred to the "K block" area. According to SIAD personnel, "K block" chemicals were either neutralized or removed by a commercial hauler in 1979 under a separate disposal contract. During excavation, all drums were observed to be intact (ESE, 1983). Based on this observation, the chemicals were believed to be completely contained within the drums and the area was believed to be uncontaminated (ESE, 1983).

Buried chemicals included pesticides (0.5 percent diazinon [1,000 liters (l)] and chlordane dust [4,500 kilograms (kg)]), toluene (365 l), xylene (235 l), paint (3,800 l), 1,1,1-trichloroethane (28 kg), and mercuric oxide (3 kg) (Benioff, et al., 1988).

4.2.3 Highlights of Community Participation

One 30-day public comment period was held from February 7, 1996, to March 7, 1996. A public meeting was held at SIAD on February 22, 1996. Representatives of the Army, DTSC, and the Lahontan RWQCB were present at the meeting. Responses to site-specific questions raised by the public at this meeting are presented in Section 4.3 of this ROD/RAP.

The public participation requirements of CERCLA § 113(K)(2)(B)(i-v) and § 117 and § 25356.1 of the California Health and Safety Code were met in the remedy selection for this site. The response action presented for this site in this ROD/RAP was selected in accordance with CERCLA, NCP, Chapter 6.8 of the California Health and Safety Code, and California Water Code. The basis for this decision is documented in the Administrative Record.

4.2.4 Scope and Role of Response Action

This ROD/RAP presents the final response action for the Chemical Burial Site. This site poses no potential threat to human health and the environment. The selected remedy is No Action. This will be the final action for the Chemical Burial Site.

4.2.5 Site Characteristics

The 1990 Phase I RI of the Chemical Burial Site was conducted to investigate the possibility of contamination resulting from trench burial of retrograde drummed chemicals (Benioff, et al., 1988). Potential soil and groundwater contamination was assessed based on a soil-gas survey, test pit sampling, subsurface-soil sampling, monitoring well installation, and groundwater sampling. Additional groundwater sampling was conducted at the site during the 1991 Group II RI, 1992 Group I Follow-Up RI, and 1993 Group I and II Follow-Up RI. An assessment of potential contamination at the site based on these data is provided in the following subsections.

4.2.5.1 Soil-Gas Survey

Soil-gas samples were collected and analyzed from 48 locations at the Chemical Burial Site to identify VOC soil sources. Target analytes were trichloroethane (TCA), TCE, tetrachloroethene (PCE), methylene chloride, chloroform, carbon tetrachloride, 1,2-DCA, benzene, ethylbenzene, toluene, and xylenes (BETX), and total hydrocarbons.

Low levels of TCE were detected in soil gas from the southwest portion of the Chemical Burial Site (Figure 4.2). The TCE detected in this area is believed to be the northeastern extension of the elevated TCE soil-gas concentrations associated with the northwestern portion of the Abandoned Landfill. Low levels of TCE were also detected in the northeastern portion of the Chemical Burial Site along Burning Ground Road (Figure 4.2). No other significant levels of VOCs were detected during the soil-gas survey at the Chemical Burial Site.

4.2.5.2 Test Pits

Three test pits were excavated to depths of 5 feet at the Chemical Burial Site (Figure 4.3) to search for possible buried drums. Three to 4 feet of fill material was uncovered in each test pit; the fill material consisted of clean sand that was similar in character to the native soil of the area. A small geophysical anomaly was uncovered in CCB-03-TP (Figure 4.3), and was found to be a piece of asphalt approximately 2 feet bgs. Buried drums were not found in the three test pits.

4.2.5.3 Soil

Three soil borings were drilled to the water table at this site (Figure 4.4). Soil samples were collected from each soil boring at the 5-foot interval to 50 feet and at the 10-foot interval from 50 feet to the water table. Samples were analyzed for extractable organic compounds (phenols, pesticides/ polychlorinated biphenyls [PCBs], base neutral/acid extractable compounds [BNAs]), VOCs, and inorganics (priority pollutant metals and cyanide). The 5-foot sample from each boring was analyzed for dioxin/furans. Analytical results are discussed below.

Low levels of pesticides (chlordane, heptachlor, and heptachlor epoxide), and phenols were detected in subsurface soil (Figure 4.4). These compounds are not likely to be a source of groundwater contamination due to the low frequency of detection, depth to groundwater (approximately 80 to 90 feet bgs), and the low concentrations detected. The presence of phenols was not confirmed by gas chromatography/mass spectroscopy (GC/MS) analysis. This could be due to poor recoveries of phenols in the GC/MS extraction or to a positive interference in the spectrophotometric method.

Trace concentrations of toluene and trichlorofluoromethane were detected in near-surface and subsurface soil (Figure 4.5). As with the extractable organics detected in soil at this site, these VOCs are probably not a source of groundwater contamination.

No inorganic constituents were detected in soil above what are considered background soil levels at this site.

Dioxins were detected in two of the three soil samples analyzed for dioxin/furans. Total octachloro-dibenzo-p-dioxin (TOCDD) was detected in CCB-02-SB and CCB-03-SB at 0.000062 µg/g and 0.000064 µg/g, respectively.

4.2.5.4 Groundwater

Groundwater monitoring wells were installed at the Abandoned Landfill and Chemical Burial Site as part of the 1990 Phase I RI (Figure 4.6). Two wells (CCB-01-MWA and CCB-02-MWA) were installed specifically to monitor groundwater beneath the Chemical Burial Site. These wells were sampled and analyzed over two successive months during 1990 for extractable organics (phenols, SVOCs, pesticides/PCBs), VOCs, and inorganics (priority pollutant metals and cyanide). The wells were subsequently sampled during the 1991 Group II RI, 1992 Group I Follow-Up RI, and 1993 Group I and II Follow-Up RI. Results from this total of eight groundwater sampling rounds are summarized below.

TCE has been detected in monitoring well CCB-02-MWA at concentrations ranging from 4.7 to 12 μg/l. Because groundwater flow at the site is to the northeast, well CCB-02-MWA is in an upgradient location. The TCE detected in CCB-02-MWA is interpreted to be part of a TCE plume originating from the northwestern portion of the Abandoned Landfill to the south. Toluene was detected in two of eight sampling rounds in well CCB-01-MWA. No other VOCs or extractable organic compounds have been detected in well CCB-01-MWA, which is immediately north (down-gradient) of the site. Based on these groundwater monitoring data, the Chemical Burial Site is not a source of VOCs or extractable organic compounds in groundwater.

All inorganic compound concentrations detected were below MCLs and interpreted to be naturally occurring.

4.2.6 Summary of Site Risks

This section summarizes the baseline risk assessment conducted for the Chemical Burial Site and Construction Debris Landfill during the 1990 Phase I RI. The Chemical Burial Site and Construction Debris Landfill were evaluated together in the baseline risk assessment due to their close proximity.

4.2.6.1 Compounds of Potential Concern

Chlordane, heptachlor, heptachlor epoxide, trichlorofluoromethane in subsurface soil, and TCE in groundwater were identified as COPCs for the Chemical Burial Site and Construction Debris Landfill in the 1990 Phase I RI Report (JMM and E.C. Jordan, 1991).

4.2.6.2 Contaminant Fate and Transport

This section describes the processes expected to control the fate and transport of chemicals identified as COPCs at the Chemical Burial Site/Construction Debris Landfill and the primary chemical and physical properties impacting those processes.

Chlordane, heptachlor, heptachlor epoxide, and trichlorofluoromethane have been identified as COPCs in near-surface and subsurface soil at the Chemical Burial Site/Construction Debris Landfill.

A potential route of migration for these chemicals is leaching from the soil to shallow groundwater. However, given the low frequency of detection, depth to groundwater (approximately 80 to 90 feet bgs), limited precipitation at the site, and the low concentrations detected, it is unlikely that the COPCs in near-surface and subsurface soil pose a threat to groundwater.

The pesticides probably present the greatest threat to potential environmental receptors due to their long biological half-life and their propensity for bioaccumulation. However, because these compounds were not detected in surface soil, they are not readily bioavailable.

4.2.6.3 Human Health Risks

The results of the human health risk assessment conducted for the Chemical Burial Site/Construction Debris Landfill are summarized in Table 4.1.

Soil

The ELCR and HI for current casual visitors are 2×10^{-8} and 0.0007, respectively (Table 4.1). The ELCR estimate is below the California benchmark of 1×10^{-6}. The HI is less than the benchmark of 1.

For future construction workers at the Chemical Burial Site/Construction Debris Landfill, the ELCR and HI are 5×10^{-8} and 0.04, respectively (Table 4.1). The ELCR estimate is below the California benchmark of 1×10^{-6}. The HI is less than the benchmark of 1.

Risks for hypothetical future adult residents at the Chemical Burial Site/Construction Debris Landfill were also estimated. The ELCR for a hypothetical future adult resident exposed to soil is 3×10^{-8}. The ELCR estimate is below the California benchmark of 1×10^{-6}. The HI was not calculated for the future resident exposed to soil.

Groundwater

Risks were estimated for hypothetical future residential use of groundwater even though potential future use of the shallow groundwater is highly unlikely. The ELCR and HI for a hypothetical future adult resident exposed to groundwater are 2×10^{-4} and 0.4, respectively. The HI is less than the benchmark of 1. The elevated ELCR is due to concentrations of TCE and naturally occurring levels of arsenic in groundwater. TCE was detected in monitoring well CCB-02-MWA, which is located upgradient of the Chemical Burial Site. Soil gas and groundwater monitoring data from the Abandoned Landfill suggest that well CCB-02-MWA may be within a TCE plume originating in the northwestern portion of the Abandoned Landfill (Figure 4.6).

4.2.6.4 Environmental Risks

A qualitative environmental assessment was performed for the Chemical Burial Site/Construction Debris Landfill (JMM and E.C. Jordan, 1991). The purpose of this assessment was to evaluate the potential for adverse effects to ecological receptors as a result of possible exposure to chemicals originating from these sites. Environmental assessment results indicate that low concentrations of pesticides and trichlorofluoromethane detected in near-surface and subsurface soil at these sites combined with the small size of the sites would not be expected to pose significant adverse effects to the environment.

4.2.7 Description of the No Action Alternative

Based on the results of the baseline risk assessment conducted for the Chemical Burial Site, there are no adverse impacts to human health or the environment from site-related activities. Thus, the No Action alternative is supported by the baseline risk assessment discussed in Section 4.2.6 and the Administrative Record.

4.2.8 Explanation of Significant Changes

The Proposed Plan for the nine sites was released to the public for comment on February 7, 1996. The preferred alternative identified for the Chemical Burial Site was No Action. Based on the absence of any new information or comments during the public comment period, no significant

changes to the selected remedy for the Chemical Burial Site outlined in the Proposed Plan for Nine Sites were necessary.

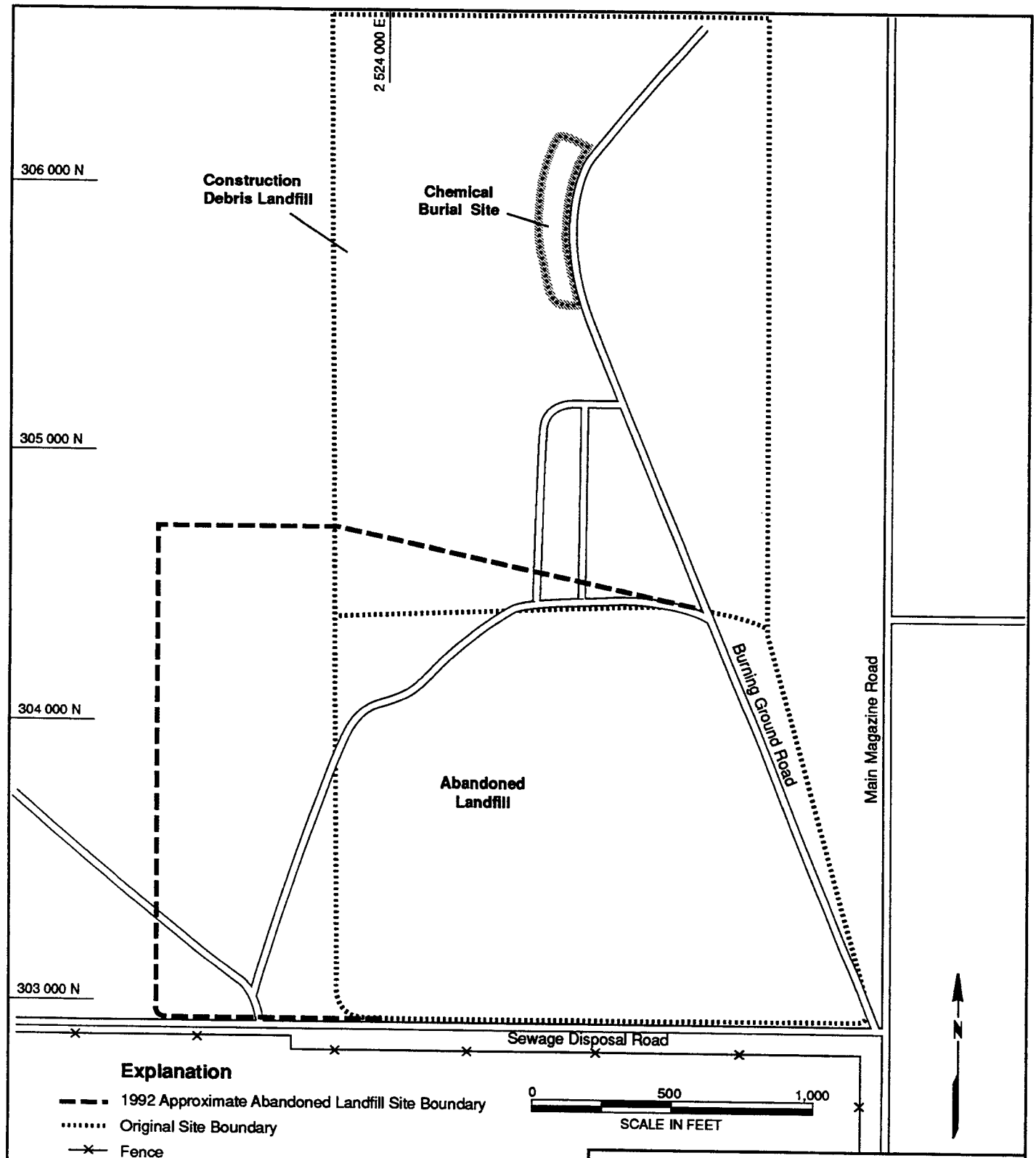
4.3 Responsiveness Summary

The public comment period for the Proposed Plan for Nine Sites at SIAD began on February 7, 1996, and extended through March 7, 1996. No written comments were received by the Army or regulatory agencies. The public meeting presenting the Proposed Plan was held on February 22, 1996. No oral comments were received regarding the Chemical Burial Site at the public meeting.

Table 4.1: Summary of Multipathway Exposures at the Chemical Burial Site and Construction Debris Landfill

Exposure Scenario/Exposure Pathway	Hazard Index	Excess Lifetime Cancer Risk
Current Casual Visitor		
Soil Exposure	0.0007	2E-08
Current and Future Construction Worker		
Soil Exposure	0.04	5E-08
Hypothetical Future Adult Resident		
Soil Exposure	N/C	3E-08
Groundwater Exposure	0.4	2E-04

N/C Not calculated



SRA 1071.9 11/8/95 ECS

Explanation

- 1992 Approximate Abandoned Landfill Site Boundary
- Original Site Boundary
- Fence
- Road
- 305 000 N California State Plane Coordinate System, Zone 1

Modified from Montgomery Watson (1993)

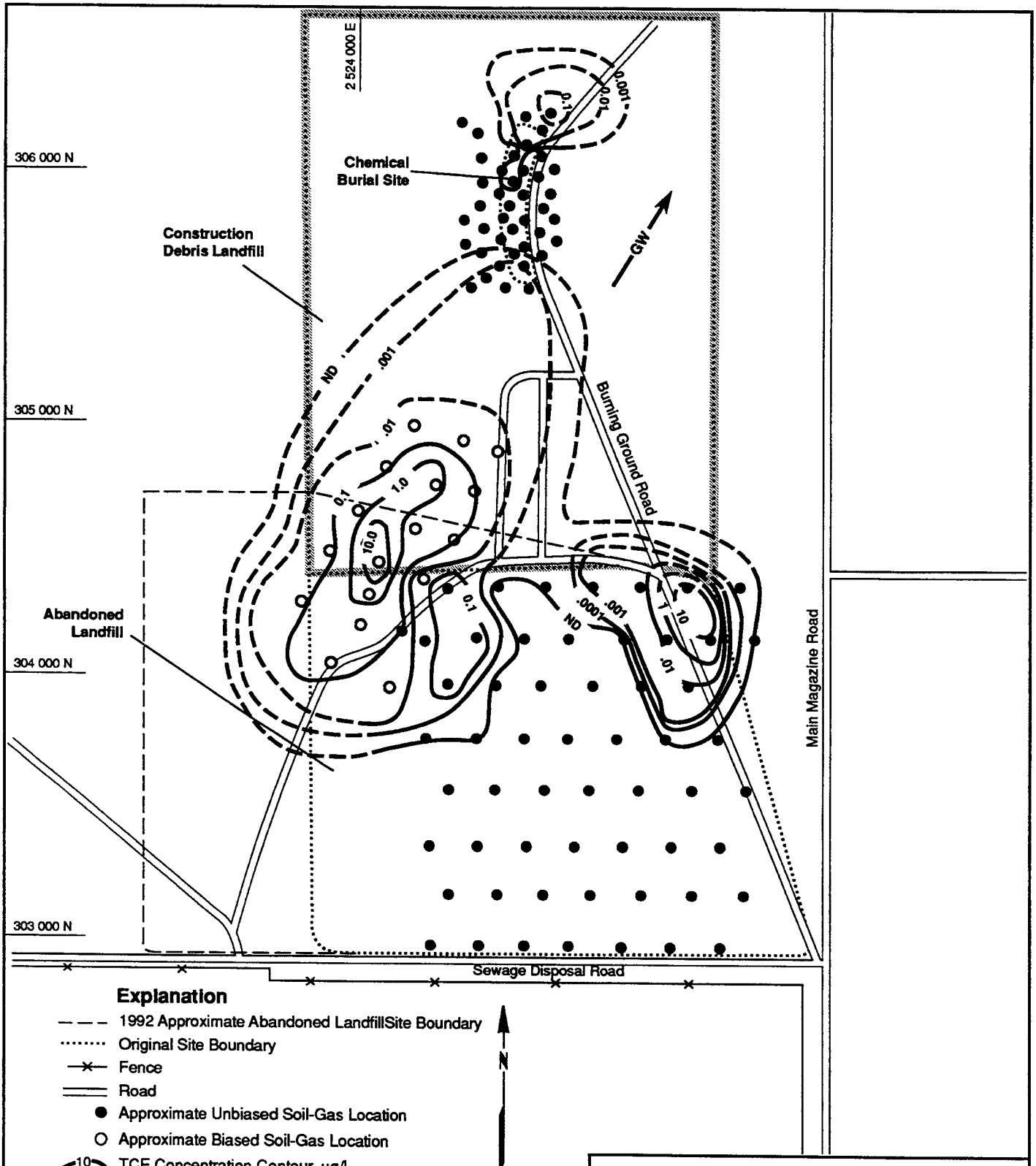
Harding Lawson Associates
Engineering and Environmental Services

Prepared for:
U.S. Army Environmental Center
Aberdeen Proving Ground, Maryland

Sierra Army Depot, Lassen County, California

Figure 4.1

Location Map - Chemical Burial Site



Harding Lawson Associates
Engineering and Environmental Services

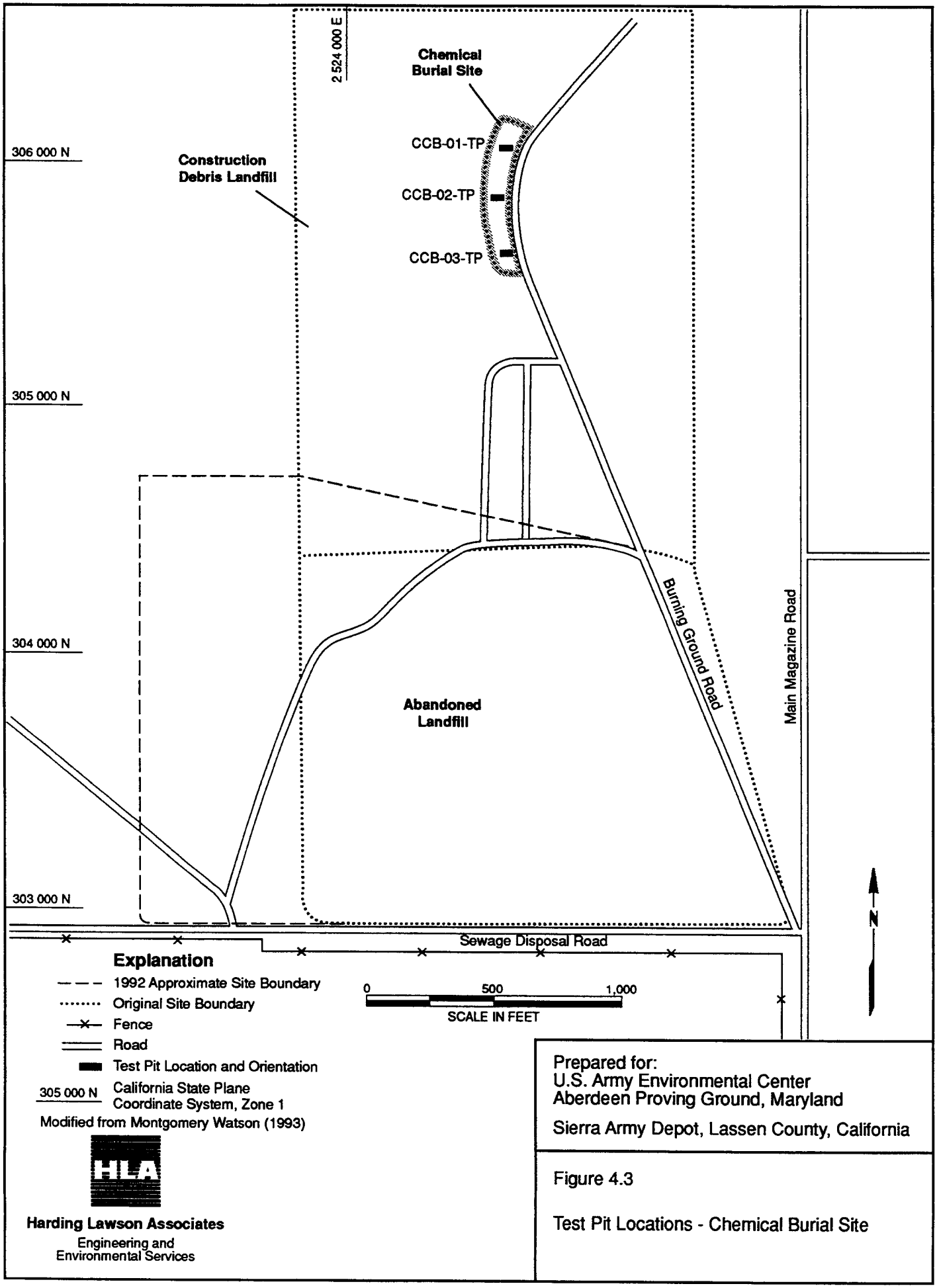
Prepared for:
U.S. Army Environmental Center
Aberdeen Proving Ground, Maryland

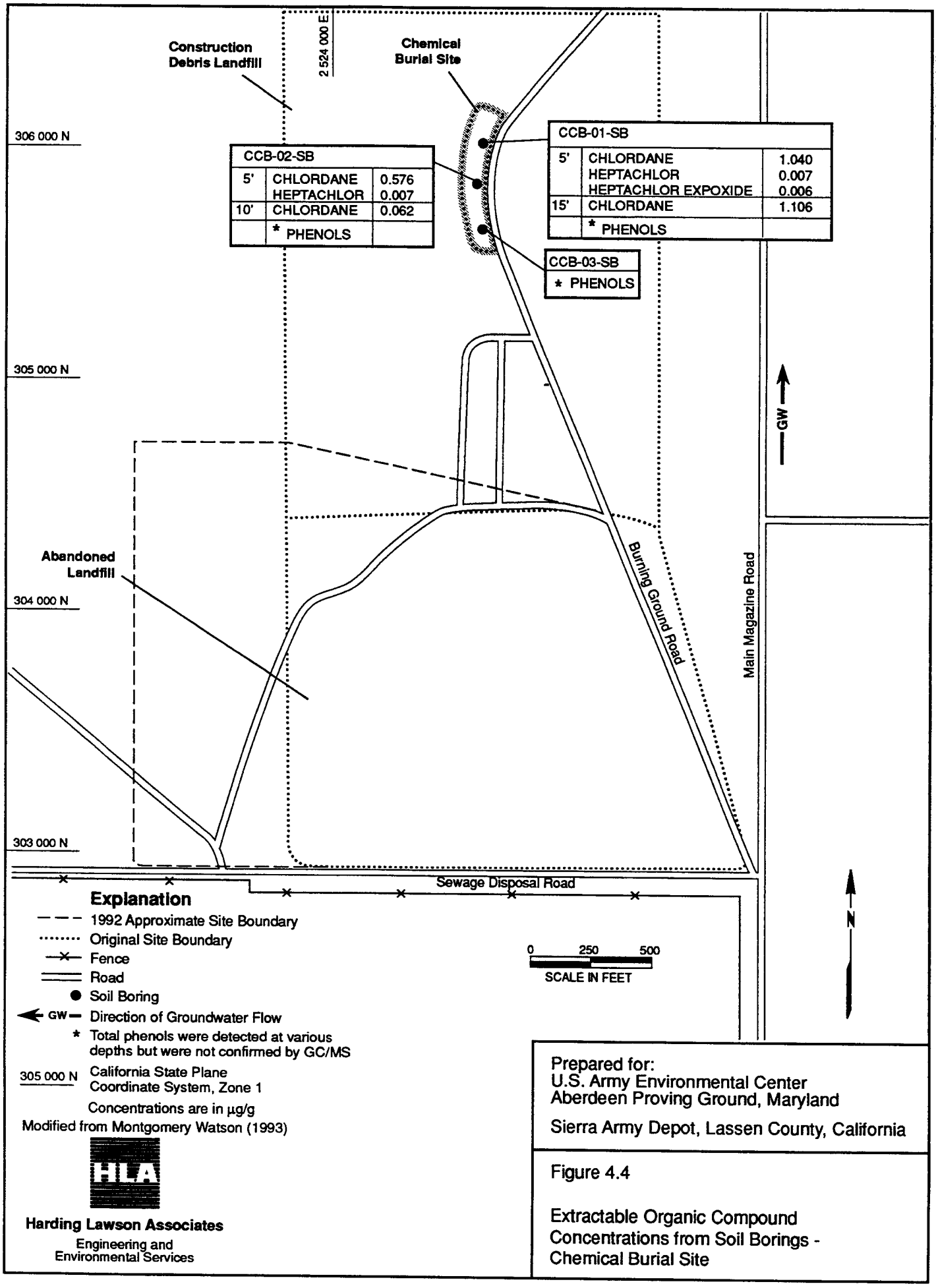
Sierra Army Depot, Lassen County, California

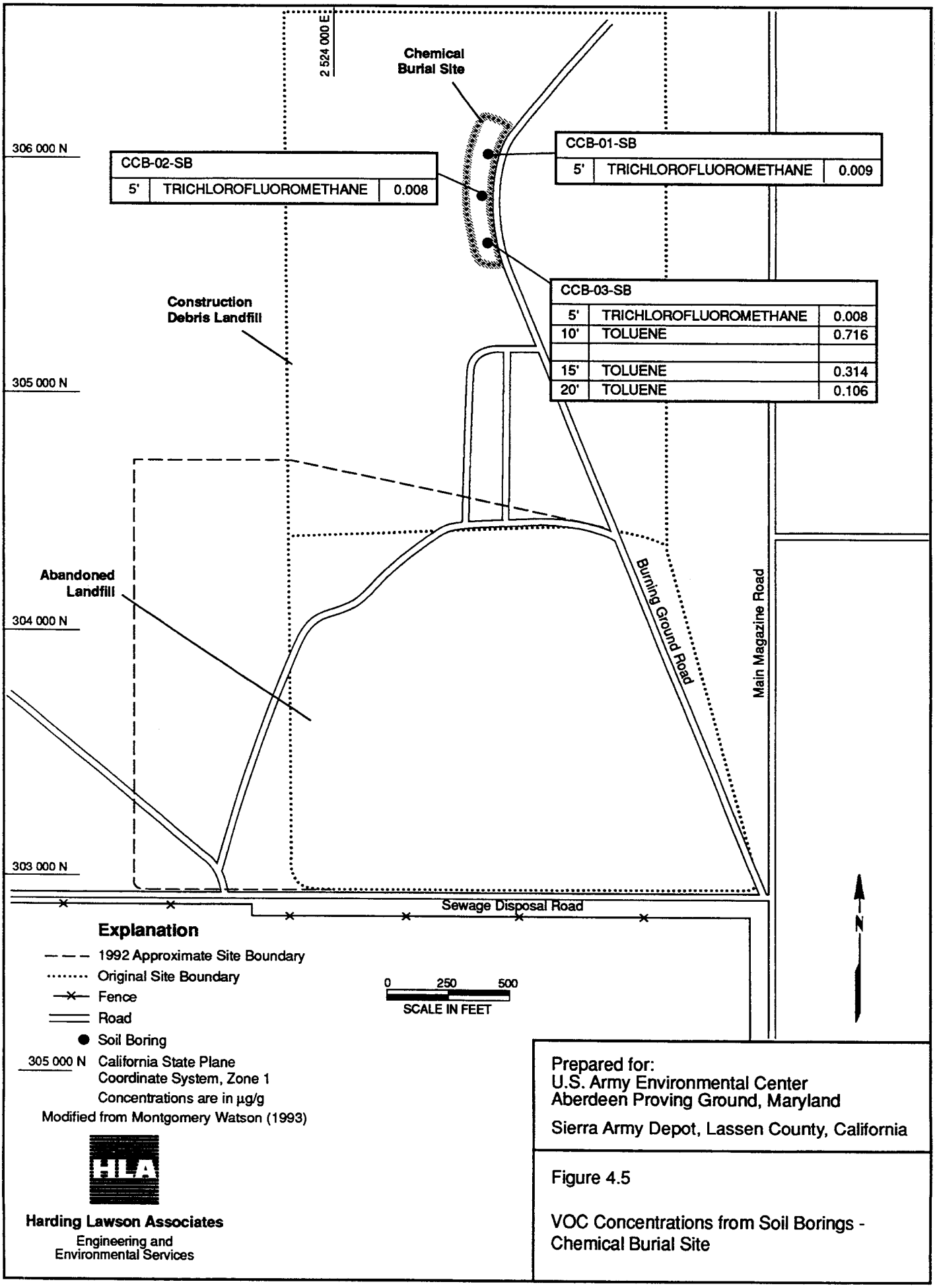
Figure 4.2

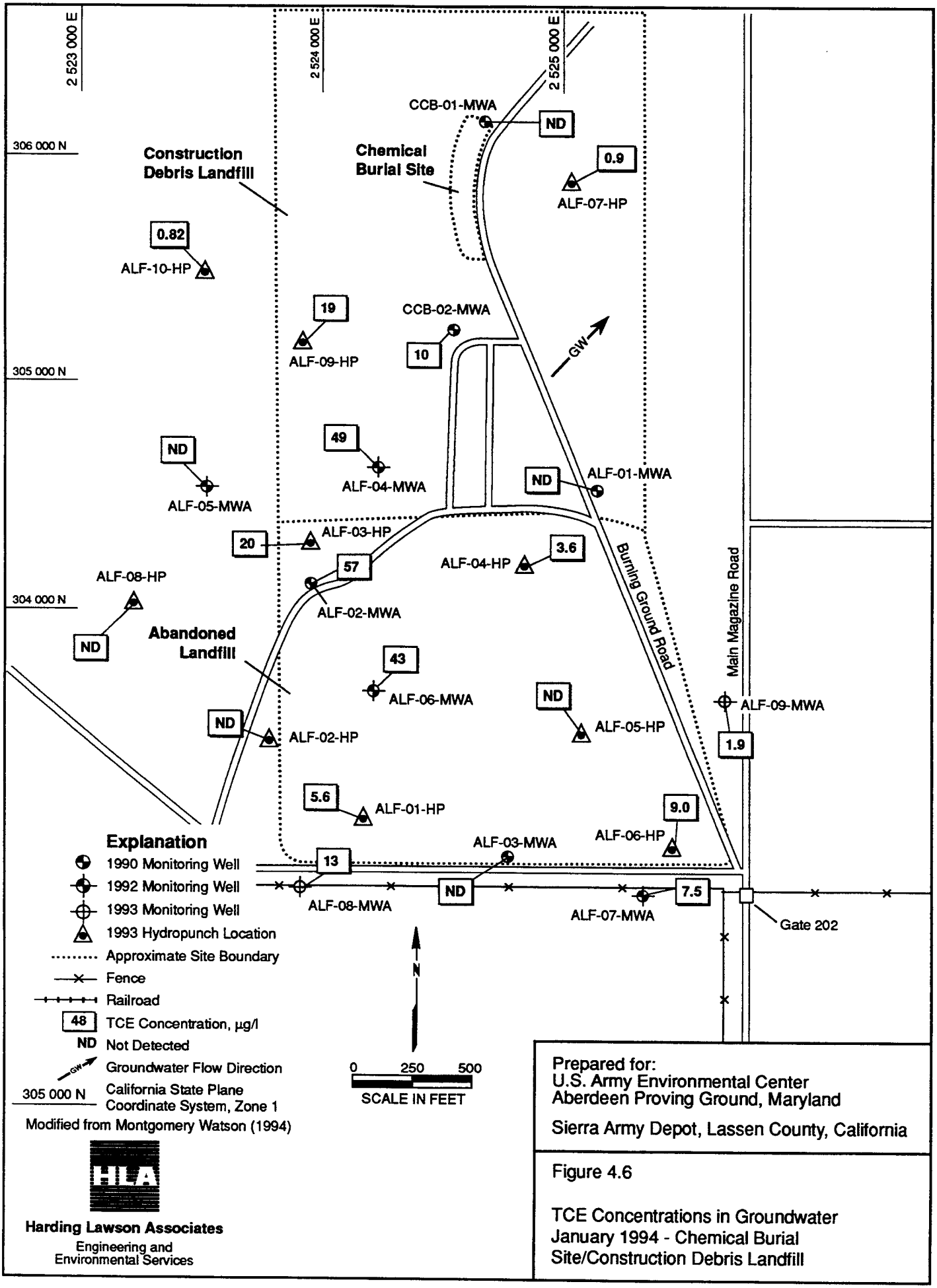
TCE Soil-Gas Plume - Chemical Burial Site/Construction Debris Landfill

SRA 1071.10 11/8/95 ECS


SRA 1071.11 11/3/95 ECS
2 524 000 E
Chemical Burial Site
CCB-01-TP
CCB-02-TP
CCB-03-TP
306 000 N
Construction Debris Landfill
305 000 N
304 000 N
Abandoned Landfill
Burning Ground Road
Main Magazine Road
303 000 N
Sewage Disposal Road
N
Explanation
1992 Approximate Site Boundary
Original Site Boundary
Fence
Road
Test Pit Location and Orientation
305 000 N California State Plane Coordinate System, Zone 1
Modified from Montgomery Watson (1993)
0
500
1,000
SCALE IN FEET
Harding Lawson Associates
Engineering and Environmental Services
Prepared for:
U.S. Army Environmental Center
Aberdeen Proving Ground, Maryland
Sierra Army Depot, Lassen County, California
Figure 4.3
Test Pit Locations - Chemical Burial Site


SRA 1071.12 11/3/95 ECS
Construction Debris Landfill
2 524 000 E
Chemical Burial Site
306 000 N
CCB-02-SB
5' CHLORDANE 0.576
HEPTACHLOR 0.007
10' CHLORDANE 0.062
* PHENOLS
CCB-01-SB
5' CHLORDANE 1.040
HEPTACHLOR 0.007
HEPTACHLOR EXPOXIDE 0.006
15' CHLORDANE 1.106
* PHENOLS
CCB-03-SB
* PHENOLS
305 000 N
GW
Abandoned Landfill
304 000 N
Burning Ground Road
Main Magazine Road
303 000 N
Sewage Disposal Road
Explanation
1992 Approximate Site Boundary
Original Site Boundary
Fence
Road
Soil Boring
GW Direction of Groundwater Flow
* Total phenols were detected at various depths but were not confirmed by GC/MS
305 000 N California State Plane Coordinate System, Zone 1
Concentrations are in µg/g
Modified from Montgomery Watson (1993)
0 250 500
SCALE IN FEET
N
Harding Lawson Associates
Engineering and Environmental Services
Prepared for:
U.S. Army Environmental Center
Aberdeen Proving Ground, Maryland
Sierra Army Depot, Lassen County, California
Figure 4.4
Extractable Organic Compound Concentrations from Soil Borings - Chemical Burial Site


SRA 1071.13 11/3/95 ECS
2 524 000 E
Chemical Burial Site
306 000 N
CCB-02-SB
5' TRICHLOROFLUOROMETHANE 0.008
CCB-01-SB
5' TRICHLOROFLUOROMETHANE 0.009
CCB-03-SB
5' TRICHLOROFLUOROMETHANE 0.008
10' TOLUENE 0.716
15' TOLUENE 0.314
20' TOLUENE 0.106
Construction Debris Landfill
305 000 N
Abandoned Landfill
304 000 N
Burning Ground Road
Main Magazine Road
303 000 N
Sewage Disposal Road
N
0 250 500
SCALE IN FEET
Explanation
1992 Approximate Site Boundary
Original Site Boundary
Fence
Road
Soil Boring
305 000 N California State Plane Coordinate System, Zone 1
Concentrations are in µg/g
Modified from Montgomery Watson (1993)
HLA
Harding Lawson Associates
Engineering and Environmental Services
Prepared for:
U.S. Army Environmental Center
Aberdeen Proving Ground, Maryland
Sierra Army Depot, Lassen County, California
Figure 4.5
VOC Concentrations from Soil Borings - Chemical Burial Site


SRA 1071.14 11/8/95 ECS
2 523 000 E
2 524 000 E
2 525 000 E
306 000 N
305 000 N
304 000 N
Construction Debris Landfill
Chemical Burial Site
Abandoned Landfill
CCB-01-MWA
ND
0.9
ALF-07-HP
0.82
ALF-10-HP
19
ALF-09-HP
CCB-02-MWA
10
GW
49
ALF-04-MWA
ND
ALF-05-MWA
ND
ALF-01-MWA
20
ALF-03-HP
57
ALF-02-MWA
ALF-04-HP
3.6
ALF-08-HP
ND
43
ALF-06-MWA
ND
ALF-02-HP
ND
ALF-05-HP
ALF-09-MWA
1.9
Burning Ground Road
Main Magazine Road
5.6
ALF-01-HP
9.0
ALF-06-HP
ALF-03-MWA
13
ALF-08-MWA
ND
7.5
ALF-07-MWA
Gate 202
Explanation
1990 Monitoring Well
1992 Monitoring Well
1993 Monitoring Well
1993 Hydropunch Location
Approximate Site Boundary
Fence
Railroad
48 TCE Concentration, µg/l
ND Not Detected
Groundwater Flow Direction
305 000 N California State Plane Coordinate System, Zone 1
N
0 250 500
SCALE IN FEET
Modified from Montgomery Watson (1994)
Harding Lawson Associates
Engineering and Environmental Services
Prepared for:
U.S. Army Environmental Center
Aberdeen Proving Ground, Maryland
Sierra Army Depot, Lassen County, California
Figure 4.6
TCE Concentrations in Groundwater
January 1994 - Chemical Burial Site/Construction Debris Landfill

5.0 CONSTRUCTION DEBRIS LANDFILL

5.1 Declaration

This section provides the declaration portion of the ROD/RAP for the Construction Debris Landfill.

5.1.1 Location

The Construction Debris Landfill is located east of Main Magazine Road, within the southern portion of SIAD (Figure 1.1).

5.1.2 Assessment of the Site

The distribution and extent of contamination at the Construction Debris Landfill was assessed based on activities conducted and data obtained during the 1990 Phase I Remedial Investigation (JMM and E.C. Jordan, 1991). Groundwater sampling was conducted at the site during the 1991 Group II RI (JMM, 1992), 1992 Group I Follow-Up RI (Montgomery Watson, 1993), and 1993 Group I and II Follow-Up RI (Montgomery Watson, 1994). The results are summarized as follows:

- The potential source of contamination at the Construction Debris Landfill was the disposal of inert construction debris and possibly hazardous materials.
- No drums or other containers that may have been buried were discovered from either geophysical investigations or test pit excavations.
- Low levels of TCE in soil gas were detected in the southern portion of this site and are apparently related to the TCE detected in soil gas at the Abandoned Landfill.
- Low levels of phenol and bis(2-ethylhexyl)phthalate were detected in subsurface-soil samples. All inorganics detected in soil are interpreted to be naturally occurring.
- TCE has been detected in groundwater within the southwestern portion of the Construction Debris Landfill. The TCE in the southwestern portion of the Construction Debris Landfill is interpreted to be part of a TCE plume originating in the northwestern portion of the Abandoned Landfill. All inorganics detected in groundwater are interpreted to be naturally occurring.

No human health or ecological risks associated with soil exposure were identified at the Construction Debris Landfill. Potentially unacceptable risks to human health were identified from the detected concentrations of TCE and naturally occurring levels of arsenic in groundwater. However, the TCE is

believed to be part of a TCE plume originating from the Abandoned Landfill and thus is not associated with the Construction Debris Landfill.

5.1.3 Description of the Selected Remedy

No further action is recommended for the Construction Debris Landfill.

5.1.4 Statutory Determinations

Because no remedial actions are required at this site, no statutory determinations of remedial actions are necessary.

5.2 Decision Summary

This section provides the site-specific factors and analysis that were considered in the selection of the response action for the Construction Debris Landfill.

5.2.1 Site Description

The Construction Debris Landfill is a broad area that was used for dumping of concrete, asphalt, and construction rubble. The Construction Debris Landfill is nearly bisected by Burning Ground Road and is approximately 2,500 feet by 1,500 feet (Figure 5.1). The site was in operation from the early 1940s until closure in 1988 (USAEHA, 1988). The southern boundary of the Construction Debris Landfill overlaps the northern boundary of the Abandoned Landfill. The Chemical Burial Site is completely enclosed by the Construction Debris Landfill (Figure 5.1).

5.2.2 Site History and Enforcement Activities

The Construction Debris Landfill was in operation from the early 1940s until closure in 1988 (USAEHA, 1988). Some construction debris may have also been dumped within the Abandoned Landfill Area (Benioff, et al., 1988). The site reportedly was used only for the disposal of inert construction materials (ESE, 1983; USAEHA, 1988). The site was open to construction contractors working at SIAD for disposal of construction debris. Due to the uncontrolled nature of the site, there was the potential for disposal of hazardous materials. The site was used occasionally by base residents for disposal of household waste and appliances.

5.2.3 Highlights of Community Participation

One 30-day public comment period was held from February 7, 1996, to March 7, 1996. A public meeting was held at SIAD on February 22, 1996. Representatives of the Army, DTSC, and the Lahontan RWQCB were present at the meeting. Responses to site-specific questions raised by the public at this meeting are presented in Section 5.3 of this ROD/RAP.

The public participation requirements of CERCLA § 113(K)(2)(B)(i-v) and § 117 and § 25356.1 of the California Health and Safety Code were met in the remedy selection for this site. The response action presented for this site in this ROD/RAP was selected in accordance with CERCLA, NCP, Chapter 6.8 of the California Health and Safety Code, and California Water Code. The basis for this decision is documented in the Administrative Record.

5.2.4 Scope and Role of Response Action

This ROD/RAP presents the final response action for the Construction Debris Landfill. This site poses no potential threat to human health and the environment. The selected remedy is No Action. This will be the final action for the Construction Debris Landfill.

5.2.5 Site Characteristics

The 1990 Phase I RI of the Construction Debris Landfill was conducted to investigate the potential of contamination resulting from prior disposal activities. Potential soil and groundwater contamination was assessed based on a geophysical survey, soil-gas survey, test pit sampling, subsurface-soil sampling, monitoring well installation, and groundwater sampling. Additional groundwater sampling was conducted at the site during the 1991 Group II RI, 1992 Group I Follow-Up RI, and 1993 Group I and II Follow-Up RI.

5.2.5.1 Soil-Gas Survey

Soil-gas surveys were conducted at the Abandoned Landfill and Chemical Burial Site during the 1990 Phase I RI. The soil-gas survey at the Abandoned Landfill extended into the southwestern portion of the Construction Debris Landfill and the soil-gas survey at the Chemical Burial Site covered the central portion of the Construction Debris Landfill (Figure 4.2). Target analytes were TCA, TCE, PCE, methylene chloride, chloroform, carbon tetrachloride, 1,2-DCA, BETX, and total hydrocarbons.

Low levels of TCE were detected in two areas (Figure 4.2). The TCE soil-gas plume in the southwestern portion of the Construction Debris Landfill is believed to be related to burial trenches within the northwestern portion of the Abandoned Landfill. The low levels of TCE near the northern edge of the Chemical Burial Site may be due to a minor local source of VOCs in the soil (Figure 4.2). Based on the extremely low levels of TCE detected in soil gas within the Construction Debris Landfill, potential VOC soil contamination is not considered significant.

5.2.5.2 Test Pits

Three test pits were excavated in the southwestern portion of the Construction Debris Landfill to uncover and identify a geophysical anomaly discovered in this area (Figures 5.1 and 5.2). Excavation revealed 6 to 12 inches of burn material at the surface overlying native soil. No other buried debris was found. One soil boring, CCB-05-SB, was drilled and sampled in this area.

5.2.5.3 Soil

Two soil borings, CCB-04-MWA and CCB-05-MWA, were sampled from ground surface to the water table at this site (Figure 5.3). Soil samples were collected at the 5-foot interval to 50 feet and at the 10-foot interval from 50 feet to the water table. Soil samples were analyzed for extractable organic compounds (phenols, pesticides/PCBs, BNAs), VOCs, and inorganics (priority pollutant metals and cyanide). The 5-foot sample from each boring was analyzed for dioxin/furans.

Bis(2-ethylhexyl)phthalate was detected at a low level in one subsurface-soil sample at a depth of 35 feet bgs. Based on the isolated detection of bis(2-ethylhexyl)phthalate and the fact that the compound is a potential laboratory and sampling contaminant, the detection of bis(2-ethylhexyl)phthalate is not considered significant.

Total phenol was detected in CCB-04-SB (Figure 5.3). The presence of phenols was not confirmed by GC/MS analysis. This could be due to poor recoveries of phenols in the GC/MS extraction or to a positive interference in the spectrophotometric method.

No VOCs were detected in soil samples.

No inorganic constituents or metals were detected above what are considered background soil levels at this site.

Dioxins were detected in one of two soil samples collected for dioxin/furan analysis. TOCDD was detected at a concentration of 0.001 μg/g in the 5-foot sample collected from CCB-05-SB.

5.2.5.4 Groundwater

Four monitoring wells have been installed and two Hydropunch groundwater samples collected within the boundaries of the Construction Debris Landfill (Figure 4.6). Three of the monitoring wells have been sampled over eight rounds of sampling since 1990. The fourth well has been sampled over four rounds of sampling since installation in 1992. Based on the low levels and sporadic detection of these compounds, these detections of extractable organic compounds are not considered significant. The groundwater sampling results are summarized below.

Bis(2-ethylhexyl)phthalate has been detected sporadically at low levels in the wells, probably due to laboratory or sample contamination. Di-n-butyl phthalate and phenols were detected at low levels in

the Hydropunch sample, ALF-07-HP. No other extractable organic compounds were identified above detection limits in the groundwater at this site.

TCE has been detected in the southwestern portion of the Construction Debris Landfill and Hydropunch sample ALF-07-HP in the central portion of the site (Figure 4.6). As discussed previously, the TCE is interpreted to be part of a TCE plume originating from the northwestern portion of the Abandoned Landfill to the south. Toluene and chloroform have been detected sporadically at low concentrations. No other VOCs have been detected in groundwater within the Construction Debris Landfill. The Construction Debris Landfill does not appear to be a significant source of VOCs in groundwater.

All inorganic contaminant concentrations detected in groundwater are below MCLs and are interpreted as naturally occurring.

5.2.6 Summary of Site Risks

This section summarizes the baseline risk assessment conducted for the Chemical Burial Site and Construction Debris Landfill during the 1990 Phase I RI. The Chemical Burial Site and Construction Debris Landfill were evaluated together in the baseline risk assessment due to their close proximity.

5.2.6.1 Compounds of Potential Concern

Chlordane, heptachlor, heptachlor epoxide, trichlorofluoromethane in subsurface soil, and TCE in groundwater were identified as COPCs for the Chemical Burial Site and Construction Debris Landfill in the 1990 Phase I RI Report (JMM and E.C. Jordan, 1991).

5.2.6.2 Contaminant Fate and Transport

This section describes the processes expected to control the fate and transport of chemicals identified as COPCs at the Chemical Burial Site/Construction Debris Landfill and the primary chemical and physical properties impacting those processes.

Chlordane, heptachlor, heptachlor epoxide, and trichlorofluoromethane have been identified as COPCs in near-surface and subsurface soil at the Chemical Burial Site/Construction Debris Landfill. A potential route of migration for these chemicals is leaching from the soil to shallow groundwater. However, given the low frequency of detection, depth to groundwater (approximately 80 to 90 feet bgs), limited precipitation at the site, and the low concentrations detected, it is unlikely that the COPCs in near-surface and subsurface soil pose a threat to groundwater.

The pesticides probably present the greatest threat to potential environmental receptors due to their long biological half-life and their propensity for bioaccumulation. However, because these compounds were not detected in surface soil, they are not readily bioavailable.

5.2.6.3 Human Health Risks

The results of the human health risk assessment conducted for the Chemical Burial Site/Construction Debris Landfill are summarized in Table 5.1.

Soil

The ELCR and HI for current casual visitors are 2×10^{-8} and 0.0007, respectively (Table 5.1). The ELCR estimate is below the California benchmark of 1×10^{-6}. The HI is less than the benchmark of 1.

For future construction workers at the Chemical Burial Site/Construction Debris Landfill, the ELCR and HI are 5×10^{-8} and 0.04, respectively (Table 5.1). The ELCR estimate is below the California benchmark of 1×10^{-6}. The HI is less than the benchmark of 1.

Risks for hypothetical future adult residents at the Chemical Burial Site/Construction Debris Landfill were also estimated. The ELCR for a hypothetical future adult resident exposed to soil is 3×10^{-8}. The ELCR estimate is below the California benchmark of 1×10^{-6}. The HI was not calculated for the future resident exposed to soil.

Groundwater

Risks were estimated for hypothetical future residential use of groundwater even though potential future use of the shallow groundwater is highly unlikely. The ELCR and HI for a hypothetical future adult resident exposed to groundwater are 2×10^{-4} and 0.4, respectively. The HI is less than the benchmark of 1. The elevated ELCR is due to concentrations of TCE and naturally occurring levels of arsenic in groundwater. TCE was detected in monitoring well CCB-02-MWA, which is located upgradient of the Chemical Burial Site. Soil gas and groundwater monitoring data from the Abandoned Landfill suggest that well CCB-02-MWA may be within a TCE plume originating in the northwestern portion of the Abandoned Landfill (Figure 4.6).

5.2.6.4 Environmental Risks

A qualitative environmental assessment was performed for the Chemical Burial Site/Construction Debris Landfill (JMM and E.C. Jordan, 1991). The purpose of this assessment was to evaluate the potential for adverse effects to ecological receptors as a result of possible exposure to chemicals originating from these sites. Environmental assessment results indicate that low concentrations of pesticides and trichlorofluoromethane detected in near-surface and subsurface soil at these sites combined with the small size of the sites would not be expected to pose significant adverse effects to the environment.

5.2.7 Description of the No Action Alternative

Based on the results of the baseline risk assessment conducted for the Construction Debris Landfill site, there are no adverse impacts to human health or the environment from site-related activities. Thus, the No Action alternative is supported by the baseline risk assessment discussed in Section 5.2.6 and the Administrative Record.

5.2.8 Explanation of Significant Changes

The Proposed Plan for the nine sites was released to the public for comment on February 7, 1996. The preferred alternative identified for the Construction Debris Landfill was No Action. Based on the absence of any new information or comments during the public comment period, no significant

changes to the selected remedy for the Construction Debris Landfill outlined in the Proposed Plan for Nine Sites were necessary.

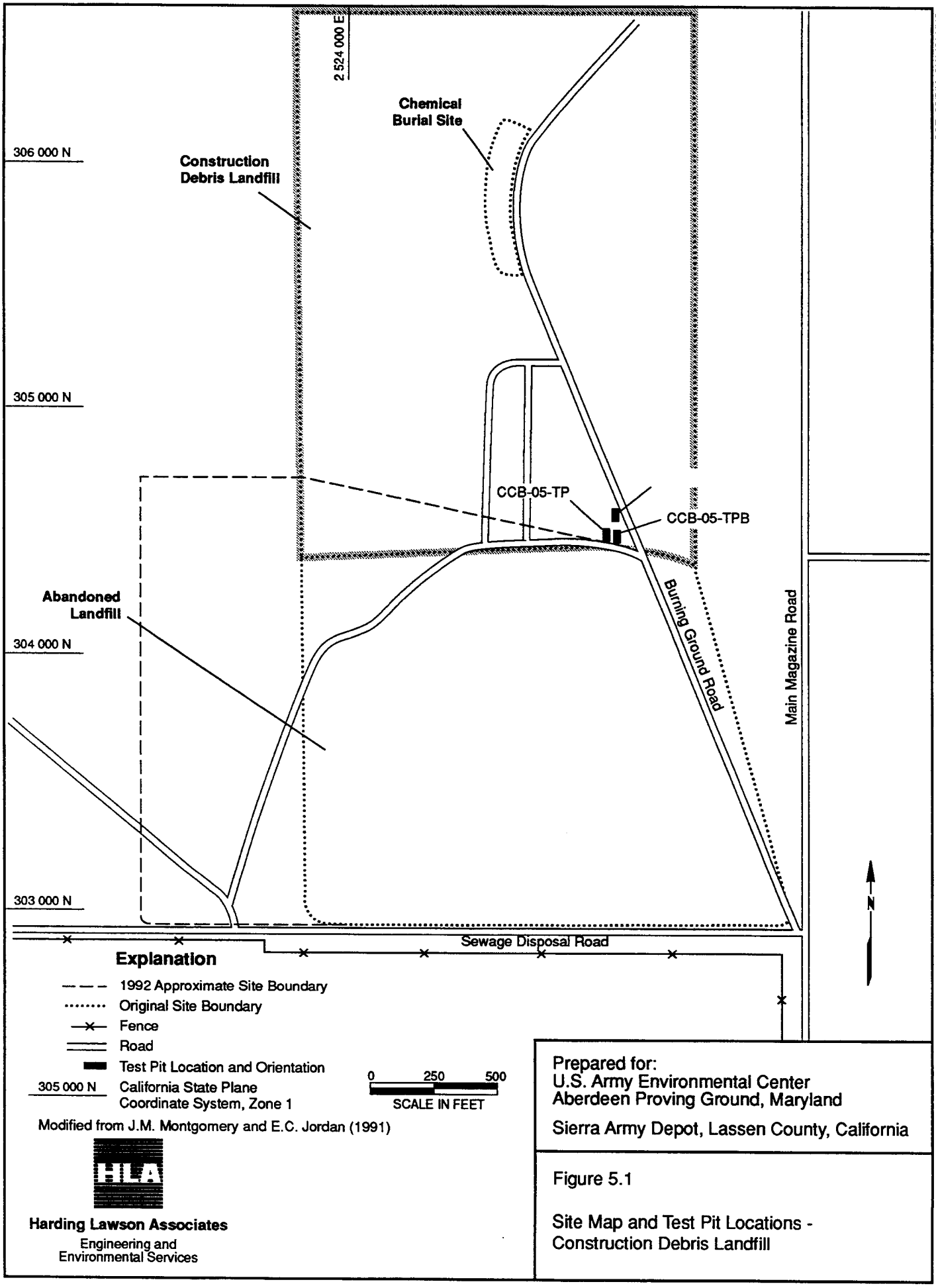
5.3 Responsiveness Summary

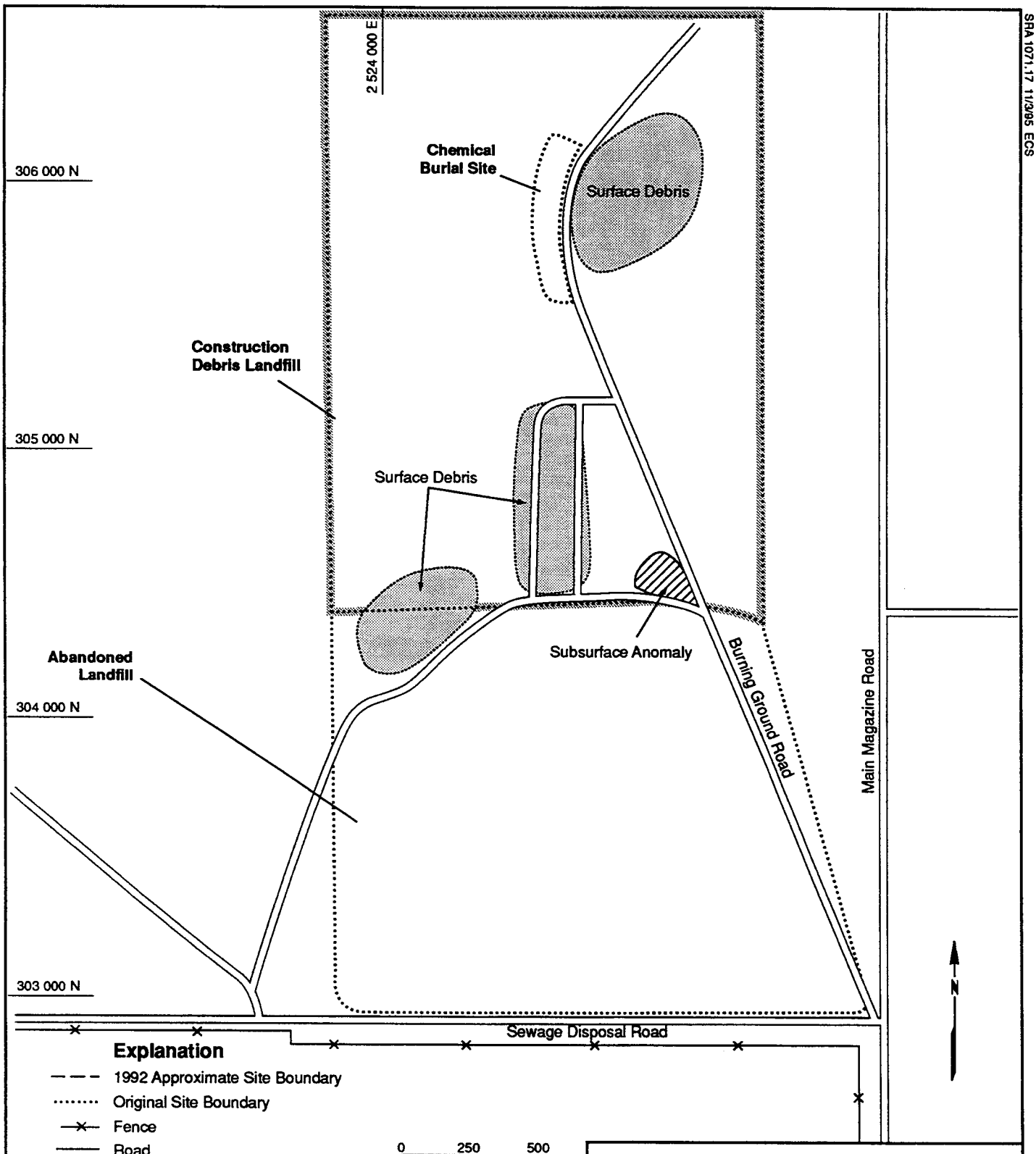
The public comment period for the Proposed Plan for Nine Sites at SIAD began on February 7, 1996, and extended through March 7, 1996. No written comments were received by the Army or regulatory agencies. The public meeting presenting the Proposed Plan was held on February 22, 1996. No oral comments were received regarding the Construction Debris Landfill at the public meeting.

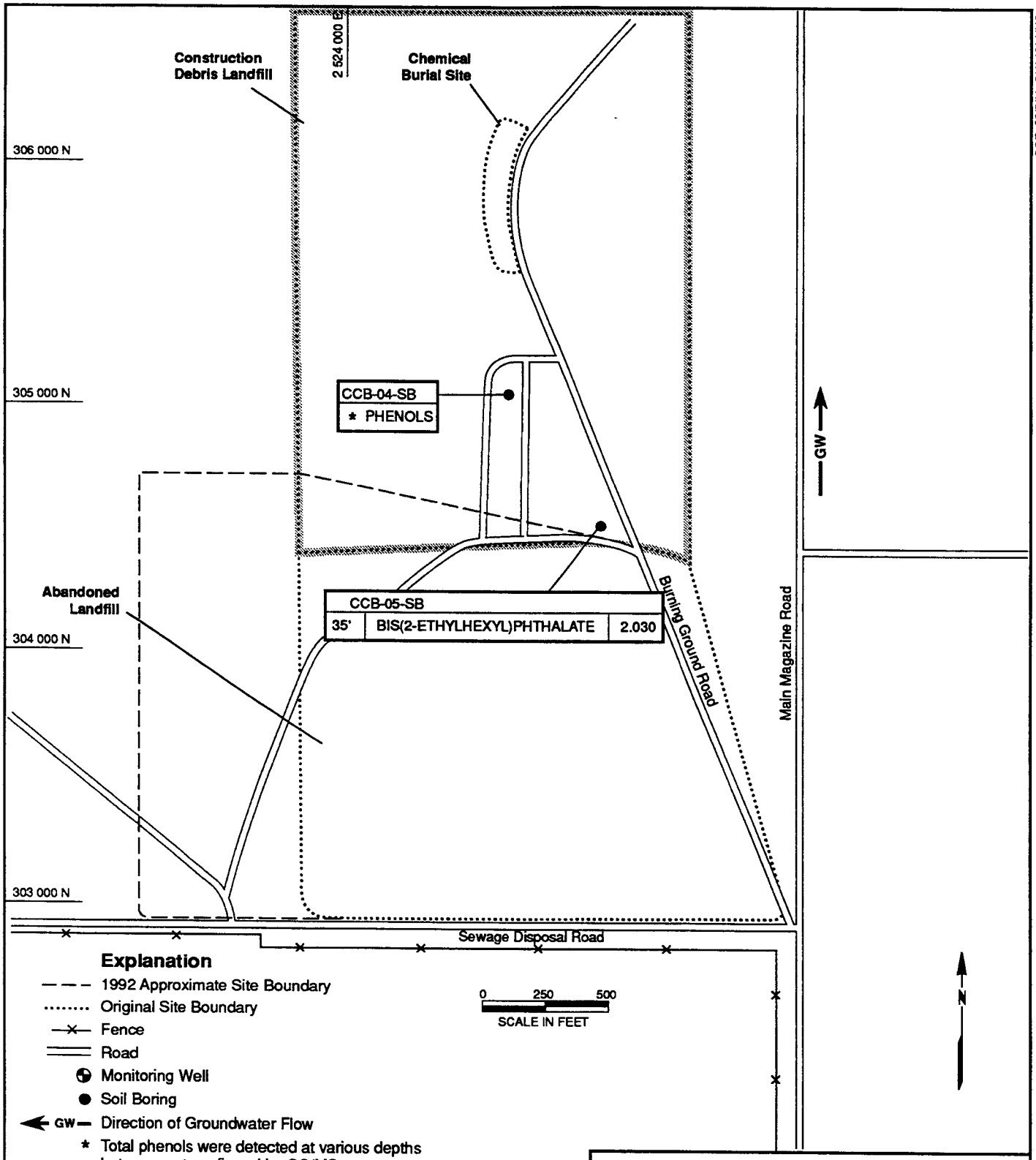
Table 5.1: Summary of Multipathway Exposures at the Chemical Burial Site and Construction Debris Landfill

Exposure Scenario/Exposure Pathway	Hazard Index	Excess Lifetime Cancer Risk
Current Casual Visitor		
Soil Exposure	0.0007	2E-08
Current and Future Construction Worker		
Soil Exposure	0.04	5E-08
Hypothetical Future Adult Resident		
Soil Exposure	N/C	3E-08
Groundwater Exposure	0.4	2E-04

N/C Not calculated


SRA 1071.16 11/3/95 ECS
2 524 000 E
Chemical Burial Site
306 000 N
Construction Debris Landfill
305 000 N
CCB-05-TP
CCB-05-TPB
Abandoned Landfill
304 000 N
Burning Ground Road
Main Magazine Road
303 000 N
Sewage Disposal Road
N
Explanation
1992 Approximate Site Boundary
Original Site Boundary
Fence
Road
Test Pit Location and Orientation
305 000 N California State Plane Coordinate System, Zone 1
0 250 500
SCALE IN FEET
Modified from J.M. Montgomery and E.C. Jordan (1991)
HLA
Harding Lawson Associates
Engineering and Environmental Services
Prepared for:
U.S. Army Environmental Center
Aberdeen Proving Ground, Maryland
Sierra Army Depot, Lassen County, California
Figure 5.1
Site Map and Test Pit Locations - Construction Debris Landfill


SRA 1071.17 11/3/95 ECS
2 524 000 E
306 000 N
305 000 N
304 000 N
303 000 N
Chemical Burial Site
Surface Debris
Construction Debris Landfill
Surface Debris
Abandoned Landfill
Subsurface Anomaly
Burning Ground Road
Main Magazine Road
Sewage Disposal Road
N
Explanation
1992 Approximate Site Boundary
Original Site Boundary
Fence
Road
Subsurface Anomaly
305 000 N California State Plane Coordinate System, Zone 1
Modified from J.M. Montgomery and E.C. Jordan (1991)
0 250 500
SCALE IN FEET
Prepared for:
U.S. Army Environmental Center
Aberdeen Proving Ground, Maryland
Sierra Army Depot, Lassen County, California
Figure 5.2
Geophysical Anomaly -
Construction Debris Landfill
Harding Lawson Associates
Engineering and
Environmental Services


Construction Debris Landfill
2 524 000 E
Chemical Burial Site
306 000 N
305 000 N
CCB-04-SB
* PHENOLS
GW
Abandoned Landfill
CCB-05-SB
35'
BIS(2-ETHYLHEXYL)PHTHALATE
2.030
Burning Ground Road
Main Magazine Road
304 000 N
303 000 N
Sewage Disposal Road
N
0
250
500
SCALE IN FEET
Explanation
1992 Approximate Site Boundary
Original Site Boundary
Fence
Road
Monitoring Well
Soil Boring
GW Direction of Groundwater Flow
* Total phenols were detected at various depths but were not confirmed by GC/MS
305 000 N California State Plane Coordinate System, Zone 1
Concentrations are in micrograms per gram (µg/g)
Modified from J.M. Montgomery and E.C. Jordan (1991)
Harding Lawson Associates
Engineering and Environmental Services
Prepared for:
U.S. Army Environmental Center
Aberdeen Proving Ground, Maryland
Sierra Army Depot, Lassen County, California
Figure 5.3
Extractable Organic Compound Concentrations from Soil Borings Construction Debris Landfill
SRA 1071.18 11/3/95 ECS

6.0 EXISTING LANDFILL

6.1 Declaration

This section provides the declaration portion of the ROD/RAP for the Existing Landfill.

6.1.1 Location

The Existing Landfill is located in the southwest portion of the Main Depot, as shown in Figure 1.1.

6.1.2 Description of the Selected Remedy

The Existing Landfill is an active site and is regulated under waste discharge requirements set forth in the California Code of Regulations (CCR), Title 23, Division 3, Article 5, Chapter 15, and as a Subtitle D facility under RCRA. Therefore, no CERCLA action is recommended for the Existing Landfill under this ROD/RAP. When current operations cease at the Existing Landfill, it will be closed under the appropriate state and federal regulations.

6.1.3 Declaration Statement

The Existing Landfill will remain active and is regulated under CCR and RCRA guidelines. A closure/postclosure plan is in place. Any future need for corrective action will be evaluated at the time of site closure. No action is recommended in this ROD/RAP under the authority of CERCLA because the site is regulated separately under CCR and RCRA guidelines.

6.2 Decision Summary

This section provides the site-specific factors and analysis that were considered in the selection of the response action for the Existing Landfill.

6.2.1 Site Description

The Existing Landfill is located in the southwest portion of the Main Depot, west of Chewing Gum Road (Figure 6.1). The site is used for the disposal of nonhazardous and inert wastes from residential and commercial entities of SIAD. The Existing Landfill receives approximately 12,000 cubic

yards of wastes per year. The remaining capacity for the Existing Landfill is estimated to be approximately 700,000 cubic yards.

6.2.2 Site History and Enforcement Activities

Pursuant to Article 3, Chapter 15 (CCR Title 23), the Existing Landfill is classified as a Class III Landfill for Nonhazardous Solid Waste. Pursuant to 40 CFR 258.2, the Existing Landfill is classified as an existing RCRA Subtitle D Municipal Solid Waste Landfill. Therefore, wastes that may be discharged legally to the Existing Landfill are classified as nonhazardous or inert solid wastes. The Existing Landfill is subject to the siting criteria and location restrictions prescribed under 40 CFR 258.10 through 258.16. No investigations have been conducted under the authority of CERCLA at this site.

6.2.3 Highlights of Community Participation

One 30-day public comment period was held from February 7, 1996, to March 7, 1996. A public meeting was held at SIAD on February 22, 1996. Representatives of the Army, DTSC, and the Lahontan RWQCB were present at the meeting. Responses to site-specific questions raised by the public at this meeting are presented in Section 6.3 of this ROD/RAP. The public participation requirements of CERCLA § 113(K)(2)(B)(i-v) and § 117, and § 25356.1 of the California Health and Safety Code were met in the remedy selection for this site.

6.2.4 Scope and Role of Response Action

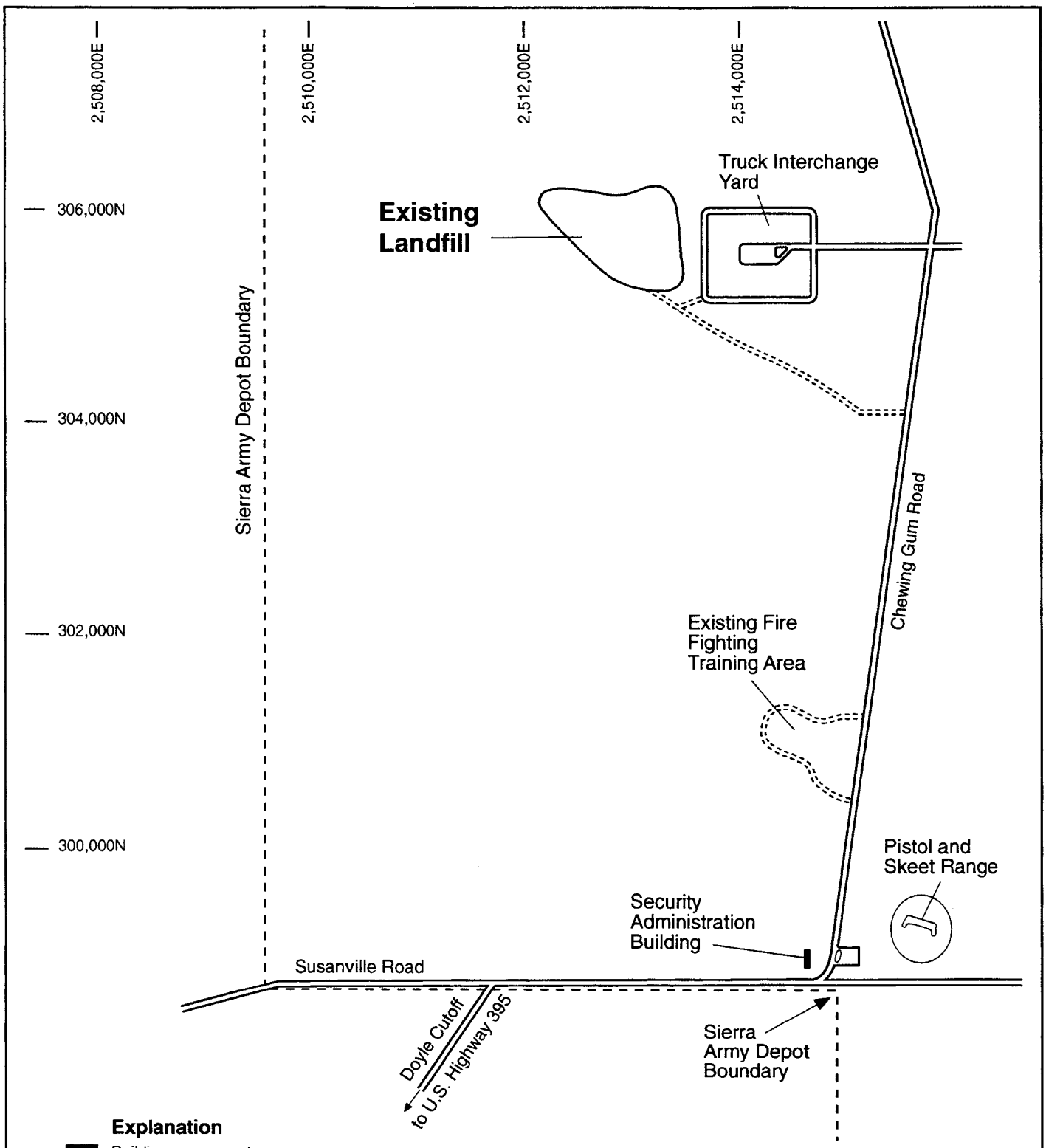
Any response action for the Existing Landfill will be undertaken according to the closure/postclosure plan already in place for the site.

6.2.5 Statutory Authority Finding

A decision on the need for remedial action at the Existing Landfill is not within the authority of CERCLA. The site is operated under CCR waste discharge requirements and RCRA Subtitle D and should be regulated accordingly.

6.3 Responsiveness Summary

The Proposed Plan for nine sites at SIAD was released to the public for comment on February 7, 1996; the public comment period extended through March 7, 1996. No CERCLA action is recommended for the existing Landfill under this ROD/RAP. No written comments were received by the Army or regulatory agencies. The public meeting presenting the Proposed Plan was held on February 22, 1996. No oral comments were received regarding the Existing Landfill at the public meeting. Based on the absence of any new information or comments during the public comment period, there are no changes to the recommended action for the Existing Landfill outlined in the Proposed Plan.



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U.S. Army Environmental Center
Aberdeen Proving Ground, Maryland

Sierra Army Depot, Lassen County, California

Figure 6.1

Location Map
Existing Landfill

7.0 EXISTING POPPING FURNACE

7.1 Declaration

This section provides the declaration portion of the ROD/RAP for the Existing Popping Furnace.

7.1.1 Location

The Existing Popping Furnace is located within the TNT Leaching Beds Area of SIAD (Figure 1.1).

7.1.2 Description of the Selected Remedy

Because this site will remain active and is regulated under RCRA guidelines, no CERCLA action is recommended for the Existing Popping Furnace under this ROD/RAP. When operations cease at the Existing Popping Furnace, it will be closed under the appropriate state and federal regulations.

7.1.3 Declaration Statement

The Existing Popping Furnace will remain active in the future and is regulated under RCRA. Therefore, decisions on the need for actions to provide adequate protection at the site will be made under the authority of RCRA. The future need for corrective action will be evaluated under RCRA at the time of site closure. No action is recommended in this ROD/RAP under the authority of CERCLA because the site is regulated under RCRA.

7.2 Decision Summary

This section provides the site-specific factors and analysis that were considered in the selection of the response action for the Existing Popping Furnace.

7.2.1 Site Description

The Existing Popping Furnace is located within Building 556 at the TNT Leaching Beds Area of SIAD (Figure 7.1). The site is used intermittently for the demilitarization of small arm munitions. This involves the burning of explosives and the separation and recovery of metals. Typical waste types incinerated in the furnace include bullets, fuses, primers, and detonators (JMM, 1987).

7.2.2 Site History and Enforcement Activities

The Existing Popping Furnace is operated under a RCRA Part B Permit and a permit from the Lassen County Air Pollution Control District. No investigations have been conducted under the authority of CERCLA at this site.

7.2.3 Highlights of Community Participation

One 30-day public comment period was held from February 7, 1996, to March 7, 1996. A public meeting was held at SIAD on February 22, 1996. Representatives of the Army, DTSC, and the Lahontan RWQCB were present at the meeting. Responses to site-specific questions raised by the public at this meeting are presented in Section 7.3 of this ROD/RAP. The public participation requirements of CERCLA § 113(K)(2)(B)(i-v) and § 117, and § 25356.1 of the California Health and Safety Code were met in the remedy selection for this site.

7.2.4 Scope and Role of Response Action

The final response action for the Existing Popping Furnace should be undertaken according to the regulations of RCRA at the time the site becomes inactive and undergoes closure.

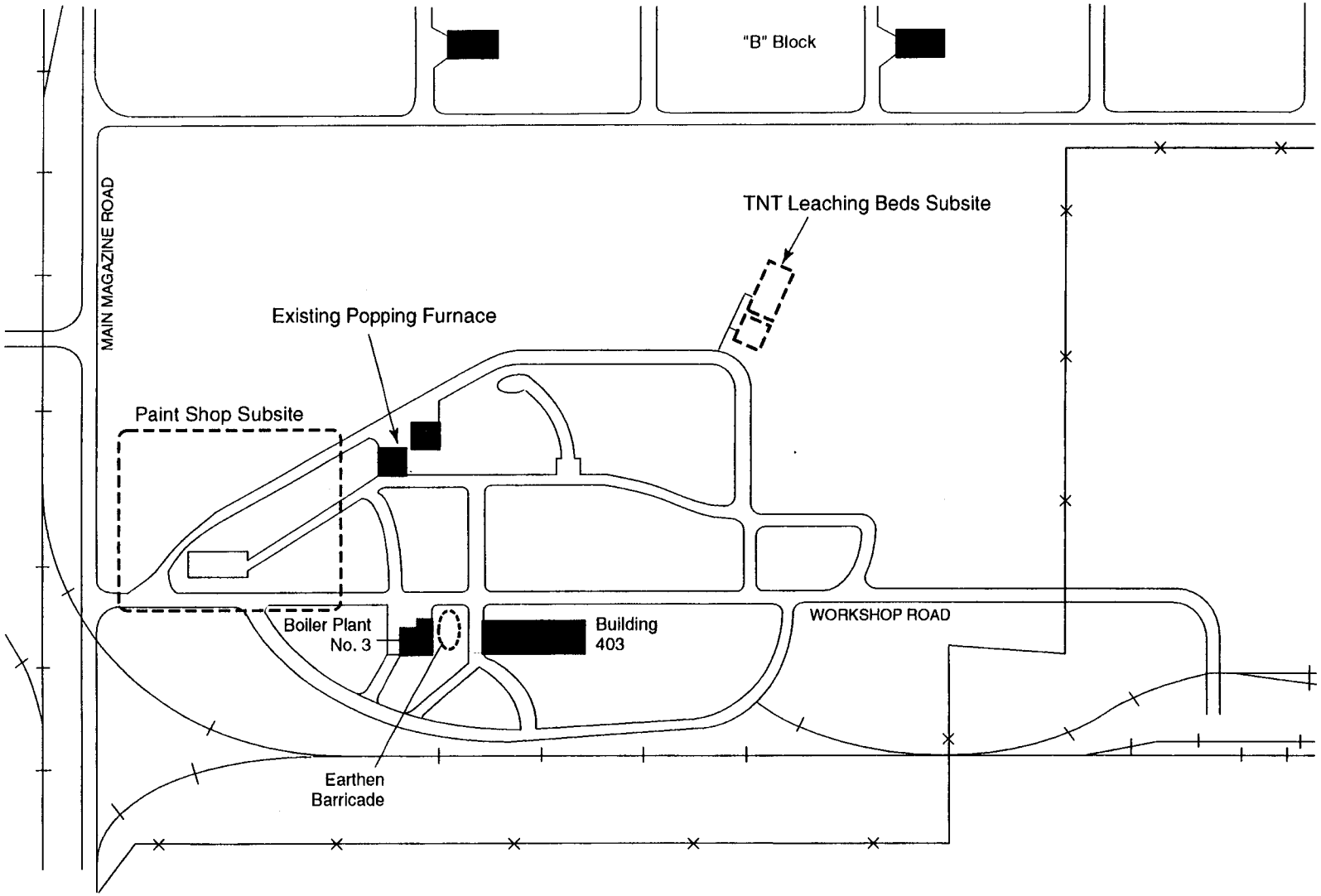
7.2.5 Statutory Authority Finding

A decision on the need for remedial action at the Existing Popping Furnace is not within the authority of CERCLA. The site is operated under the authority of RCRA and is regulated accordingly.

7.3 Responsiveness Summary

The Proposed Plan for nine sites at SIAD was released to the public for comment on February 7, 1996; the public comment period extended through March 7, 1996. No CERCLA action is recommended for the Existing Popping Furnace under this ROD/RAP. No written comments were received by the Army or regulatory agencies. The public meeting presenting the Proposed Plan was held on February 22, 1996. No oral comments were received regarding the Existing Popping Furnace at the public meeting. Based on the absence of any new information or comments during the public

comment period, there are no changes to the recommended action for the Existing Popping Furnace outlined in the Proposed Plan.



EXPLANATION

- Fence
- Railroad track
- Roadway
- Building

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HLA

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Aberdeen Proving Ground, Maryland

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Figure 7.1

Location Map
Existing Popping Furnace